

JONES DAY

51 LOUISIANA AVENUE, N.W. • WASHINGTON, D.C. 20001.2113
TELEPHONE: +1.202.879.3939 • FACSIMILE: +1.202.626.1700

DIRECT NUMBER: (202) 879-3630
BOLCOTT@JONESDAY.COM

September 17, 2019

VIA ELECTRONIC FILING

Marlene H. Dortch, Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Re: Oral *Ex Parte* Notice
ET Docket No. 18-295
GN Docket Nos. 17-183

Dear Ms. Dortch:

On September 13, 2019, representatives of The Boeing Company (“Boeing”) met with Commission staff to discuss the technical justifications for permitting the use on aircraft of unlicensed access points and client devices operating in the 6 GHz band. Boeing proposed that such unlicensed devices be required to operate at significantly reduced power on aircraft, with access points operating at a maximum power of 20 dBm EIRP per 20 MHz channel (equating to 7dBm/MHz) and both access points and client devices operating at a typical power level of 15 dBm EIRP per 20 MHz channel (equating to 2 dBm/MHz). As the presentation indicates, such limits would greatly reduce any emissions toward incumbent spectrum users in the 6 GHz band regardless of the level of signal attenuation that is assumed to result from the aircraft fuselage.

Unlicensed access points in aircraft are routinely mounted in the crown of the cabin with transmissions emanating down toward passengers. The underside of an aircraft provides very high levels of signal attenuation (at least 25 dB) toward the ground and the overhead baggage compartments obstruct the access point transmissions from the aircraft windows. Although client devices operated by passengers may have direct line-of-sight with aircraft windows, these client devices routinely operate at no more than 15 dBm EIRP within aircraft to compensate for the very small transmission distances to the ceiling-mounted access point.

The attached presentation addresses each of the potential spectrum sharing scenarios. In each case involving a terrestrial incumbent spectrum user, a separate distance of 2 kilometers is used even though aircraft in flight will routinely be more distant from potential victim receivers. With respect to emissions toward the geostationary arc, the free space loss for emissions from an aircraft at high altitude (such as 14 kilometers or nearly 46,000 feet) are nearly identical to the free

Marlene H. Dortch
September 17, 2019
Page 2

space loss for emissions from a ground-based access point, with a difference of only 0.04 dB (199.779 dB from the aircraft and 199.783 dB from a ground-based facility). Thus, Boeing's proposal to operate unlicensed devices on aircraft at reduced power levels will have an insignificant impact on potential emissions toward the geostationary arc regardless of the attenuation level attributed to the aircraft fuselage.

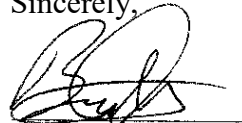
The Boeing representatives also discussed the critical need to authorize the use of 6 GHz unlicensed devices on aircraft. Unlicensed spectrum is being used for non-safety-of-life system monitoring and crew communication networks inside the aircraft. It is also used for the inflight information and entertainment systems that are employed by tens of thousands of airline passengers every day to make the traveling experience more productive and enjoyable. The inside of a commercial aircraft has rapidly become one of the single most congested wireless operating environment in the world, with hundreds of seated passengers using personal wireless devices to simultaneously access video, audio and internet content over the same inflight wireless network.

Given the significant need for access to additional unlicensed spectrum resources onboard aircraft, Boeing clarifies herein that this authority is being sought for all phases of flight on qualified aircraft (which is defined in the attached presentation), including during takeoffs and landings and while taxiing and parked at airports. Although the FAA restricts the use of large wireless devices (such as laptops) during takeoffs and landings, passengers are permitted to use small wireless devices (such as smartphones and tablets) during all phases of flight. Therefore, no restriction should be imposed on the altitude of aircraft that employ 6 GHz unlicensed devices onboard. Further, given the reduced power levels proposed for unlicensed devices operating on aircraft in the 6 GHz band, combined with the significant attenuation resulting from the aircraft fuselage, no need exists for the use of automated frequency coordination ("AFC") systems on aircraft.

Participating in the meeting on behalf of the Commission were Michael Ha, Nicholas Oros, Barbara Pavon, Hugh VanTuyl, and Bahman Badipour. Participating in the meeting on behalf of Boeing were Audrey Allison, Kim Kolb and the undersigned, with Kathleen Wong and Ron Center of Boeing participating by telephone.

Thank you for your attention to this matter. Please contact the undersigned if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bruce A. Olcott', written over a horizontal line.

Bruce A. Olcott

Counsel to The Boeing Company



6 GHz Unlicensed Devices in Aircraft

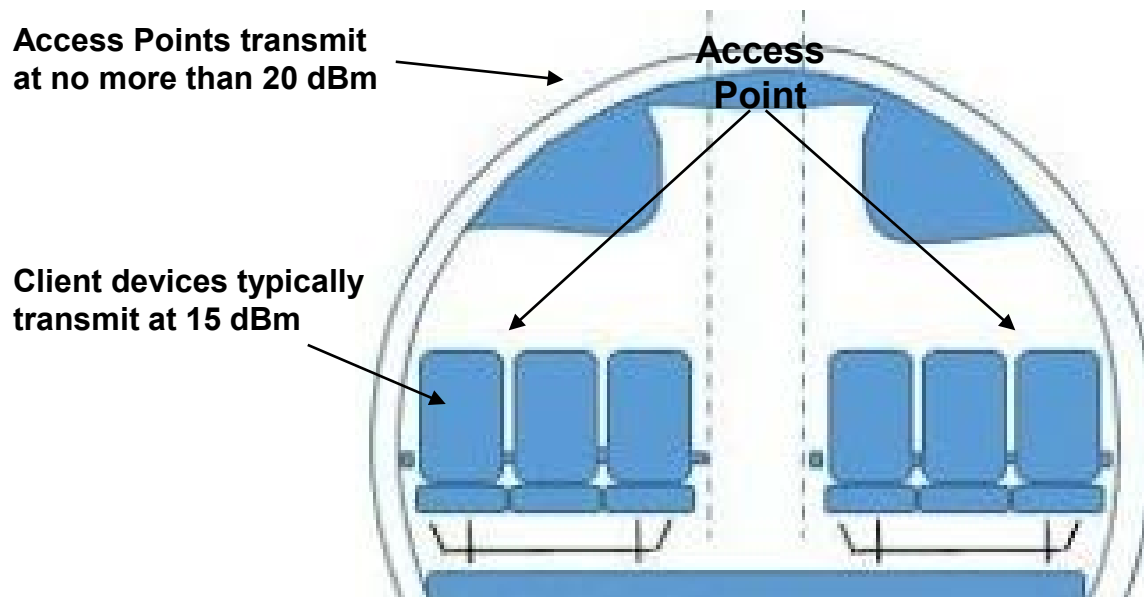
September 2019

A Substantial Need Exists to Permit Unlicensed Use Inside Aircraft in the U-NII-4 Through U-NII-8 Bands

- **Airlines and their passengers want to use wireless devices to access video, audio and internet content and for IoT using inflight wireless networks**
 - ❖ **The inside of a commercial airplane is already one of the most congested spectrum environments**
- **Boeing aircraft use the following unlicensed frequencies to support passenger demands, but access to more spectrum is needed:**
 - ❖ **2400-2483 MHz**
 - ❖ **5150-5250 MHz**
 - ❖ **5250-5350 MHz (DFS)**
 - ❖ **5470-5725 MHz (DFS)**
 - ❖ **5725-5825 MHz**
- **Given the long lead times to design, secure FAA approval, and install new equipment in thousands of aircraft, approval to use the U-NII-6 through U-NII-8 bands on aircraft is needed expeditiously**

Wireless Access Points and Client Devices Can Operate at Relatively Low Power on Aircraft

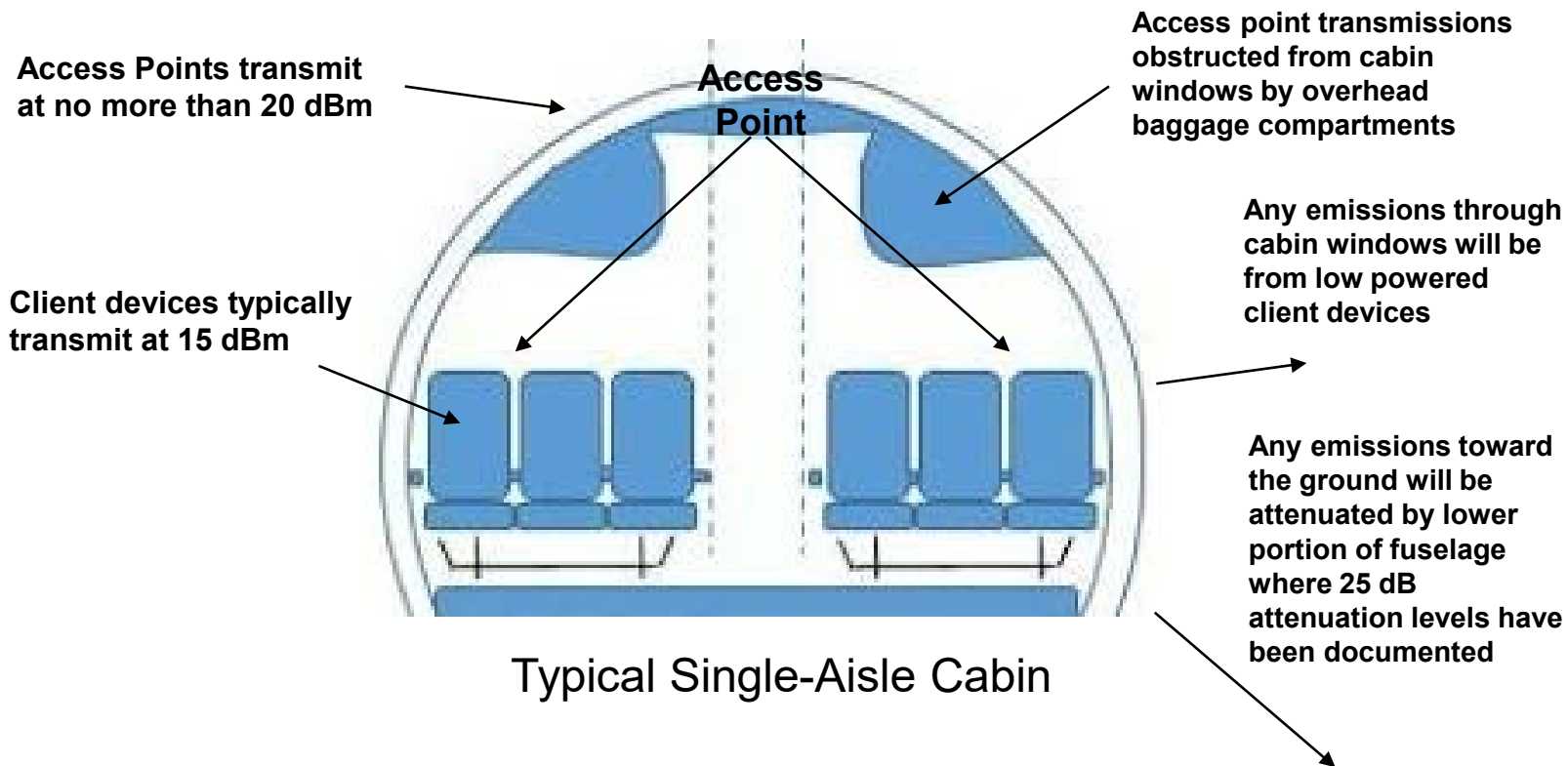
- Wireless access points on aircraft operate at a maximum power of 20 dBm and a typical power level of 15 dBm



Typical Single-Aisle Cabin

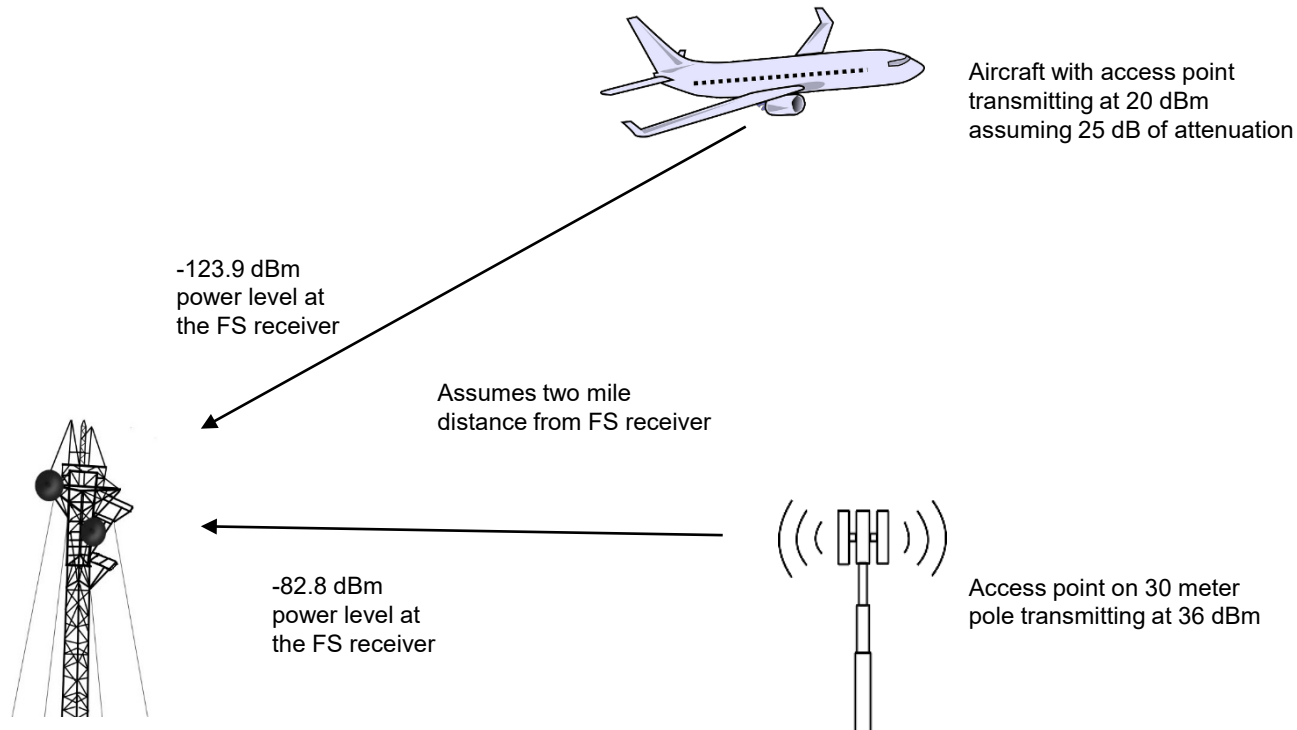
Aircraft Fuselage Will Provide Substantial Signal Attenuation Toward Potential Victim Receivers

- Ceiling mounted access points transmit down, with highly obstructed views of cabin windows



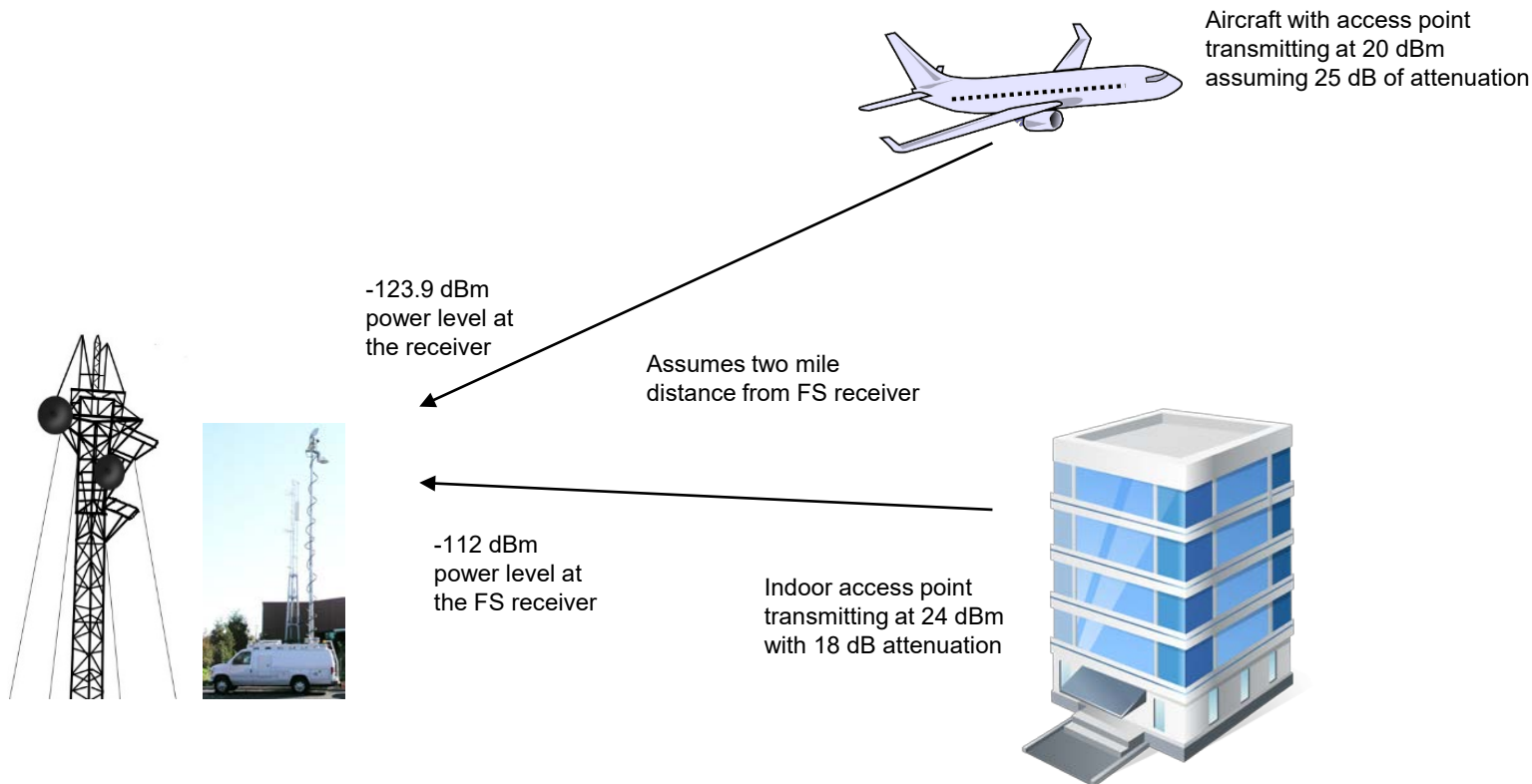
Unlicensed Access Points Can Operate on Aircraft Without Causing Harmful Interference to Terrestrial Receivers

- ❖ In the U-NII-5 and U-NII-7 bands, emissions toward fixed service receivers will be much lower than from access points mounted as high as 30 meters and transmitting at or near the proposed power limits



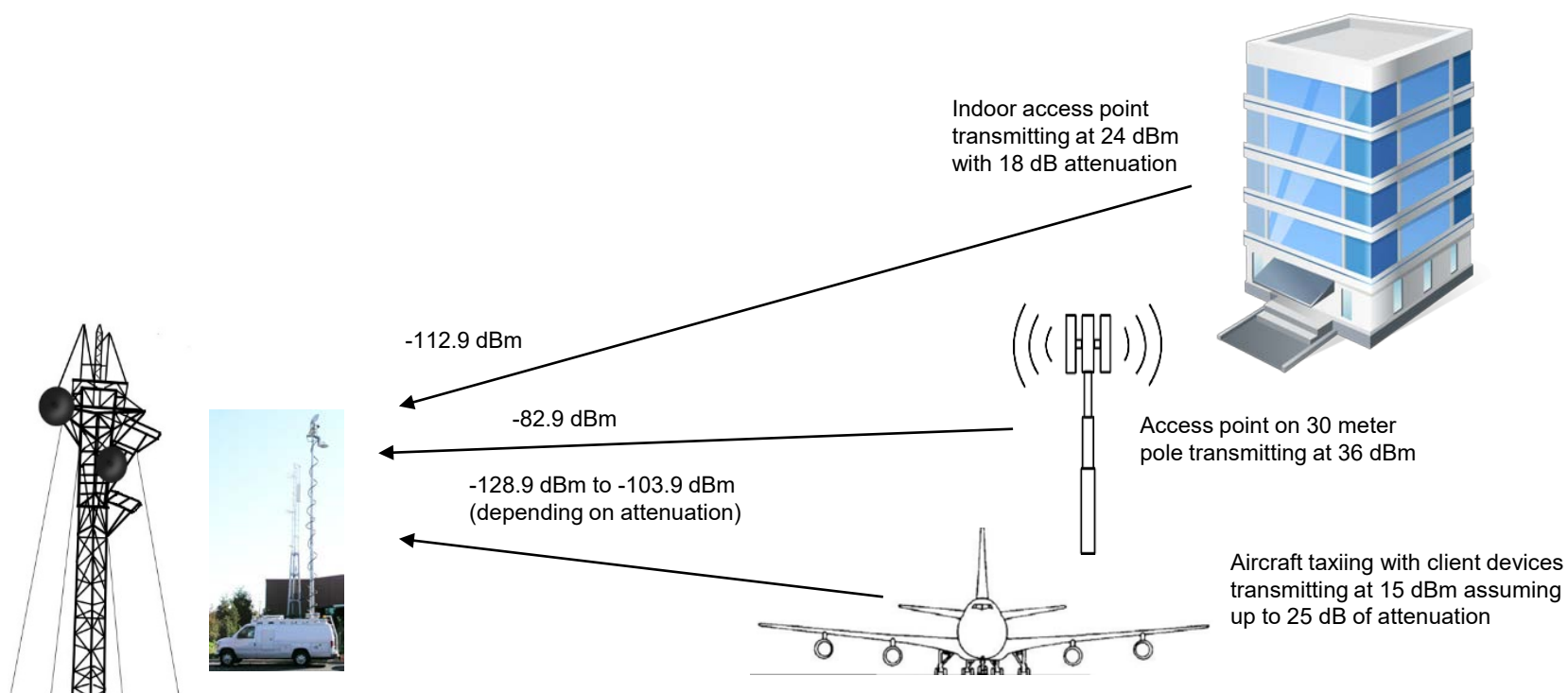
Unlicensed Access Points Can Operate on Aircraft Without Causing Harmful Interference to Terrestrial Receivers

- ❖ In the U-NII-6 and U-NII-8 bands, the combination of fuselage attenuation and free space toward the ground will protect both mobile and fixed systems



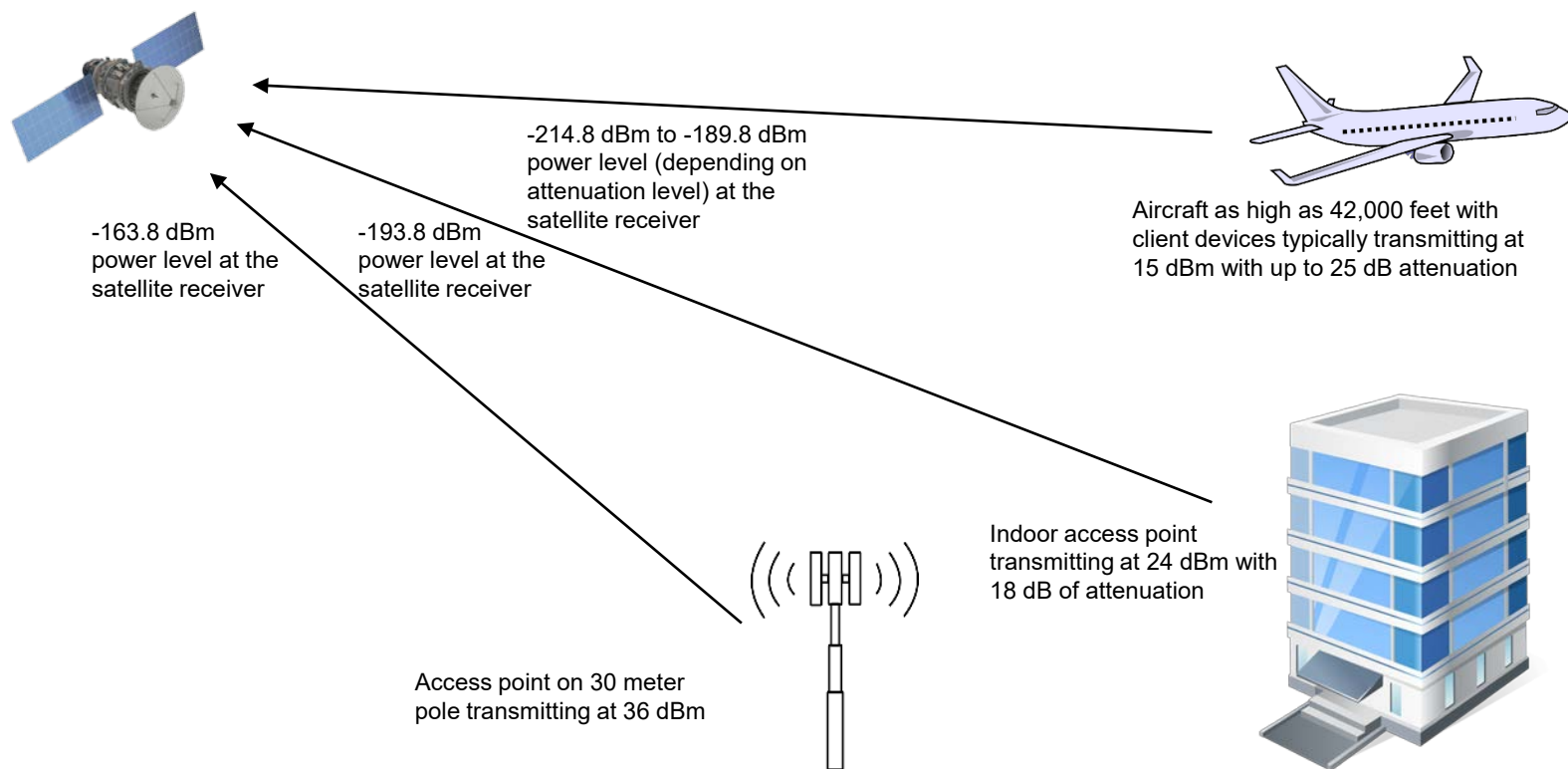
Aircraft on the Ground or on Approach Do Not Need AFC to Prevent Harmful Interference to Terrestrial Receivers

- ❖ In all four bands, the combination of relatively low transmit powers and fuselage attenuation will protect both mobile and fixed systems



Unlicensed Access Points Can Operate on Aircraft Without Causing Harmful Interference to Satellite Receivers

- ❖ In all four bands, emissions toward the geostationary arc will be comparable to or below the levels proposed for other unlicensed access points



FAA Rules Can Define the Types of Aircraft Allowed to Operate Unlicensed Access Points in the 6 GHz Band

- **Unlicensed use of the 6 GHz band on aircraft should be initially limited to jet and multi-engine aircraft using the following definition:**
 - **Reciprocating-powered multiengine airplanes and turbine-powered airplanes operated under Parts 91, 121, 125, 129 or 135 of Title 14 of the Code of Federal Regulations**
 - **Basically excludes single engine prop planes and helicopters**

